**Flame-Powered Metal-Supported SOFC Generators**

**Metal-Supported Cell**
Symmetric backbone of stainless steel and YSZ electrolyte/electrodes
LSM and SDC-Ni infiltrated into electrodes

**Direct-Flame Operation**
Flame heats cell to operating temperature (600-800°C)
Flame reforms propane to H\(_2\) and CO which are consumed by the fuel cell

**Performance**
Single cell in controlled flame
Maximum power 0.63 W/cm\(^2\)
Mass transport limited - low H\(_2\)\(_2\),CO concentrations in flame
Among highest flame-SOFC power reported

**Extremely Rapid Thermal Cycling**
Power in 10 seconds
Tolerates continuous heat/cool cycles

**Commercialization Activities**
- Cost analysis
- Customer discovery: interviewing stakeholders throughout the value chain
- Demonstration to manufacturing partners (SOFC and camping stove companies)

**Publications and presentations**
Personal power using metal-supported solid oxide fuel cells operated in a camping stove flame, M.C. Tucker, IJHE, 43, 8991-8998 (2018)
Metal-supported solid oxide fuel cells operated in direct-flame configuration, M.C. Tucker and A.S. Ying, IJHE, 38, 24426-24434 (2017)
Portable Generator Based on Direct-Flame Metal-Supported Solid Oxide Fuel Cells (MS-SOFCs), M.C. Tucker, 233rd ECS Meeting (2018)